

CLAIMS

We Claim:

1. An apparatus, comprising;

a data input device, the data input device comprising:

a lamina of light; and

an optical position detection device, optically coupled to the lamina of light, and configured to detect data entries to the input device by determining the location of interrupts in the lamina caused when data is entered to the input device.

2. The apparatus of claim 1, wherein the lamina comprises but is not limited to one of the following dimensions:

(i). a one dimension plane defined by a first axis;

(ii) a two dimensional plane defined by a first axis and a second axis; or

(iii) a three dimensional space defined by a first axis, a second axis, and a third axis.

3. The apparatus of claim 1, further comprising a display screen, the lamina of light being positioned in the free space adjacent the display screen, whereby the lamina of light in the free space adjacent to the display screen is interrupted when data entries directed to the display screen are made by contacting the display screen.

4. The apparatus of claim 1, wherein the lamina of light is of substantially uniform intensity.
5. The apparatus of claim 1, wherein the lamina of light is of substantially non-uniform intensity.
6. The apparatus of claim 1, wherein the lamina of light is generated from a collimated light source.
7. The apparatus of claim 1, wherein the lamina of light has one of the following wavelength ranges:
 - (i) an extended wavelength range from 350 to 1100 nanometers;
 - (ii) a narrow wavelength range within 2 nanometers; or
 - (iii) a substantially homogeneous wavelength.
8. The apparatus of claim 1, wherein the lamina of light has a wavelength determined by one or more of the following:
 - (i) an incandescent light source used to generate the lamina of light;
 - (ii) a specific wave length range substantially matching the response profile of a light receiving element used in the optical position detection device;
 - (iii) an Light Emitting Diode;
 - (iv) VCSEL; and/or
 - (v) an IR wavelength generator used to generate the lamina of light.

9. The apparatus of claim 1, wherein the lamina of light is continuously on during operation of the data input device.

10. The apparatus of claim 1, wherein the lamina of light is periodically cycled on and off during operation of the data input device.

11. The apparatus of claim 1, further comprising a filter device configured to subtract the measured ambient light during an off cycle of the lamina of light from the measured light during an on cycle of the lamina of light.

12. The apparatus of claim 3, wherein the display screen is for one of the follow: types of devices: a personal computer, a workstation, a computer server, a point of sale terminal, a mobile computer, a personal digital assistant (PDA). a cell phone, a combination thereof, or any other type of data entry device.

13. The apparatus of claim 1, further comprising:

a light source configured to generate the lamina of light, the light source positioned on one side of the lamina of light opposed to the optical position detection device located on the opposite side of the lamina of light.

14. The apparatus of claim 13, wherein the light source is generated from one of the following sources of light:

(i) a point source and a collimating lens;

(ii) a light transmitter having spaced facets;

(iii) an LED with facets or a lens.

15. The apparatus of claim 1, wherein the optical position detection device further comprises:

a light receiving array, the light receiving array configured to detect the position of an interrupt in the lamina of light caused during a data entry to the data input device; and

a processor, coupled to the light receiving array, the processor configured to calculate the coordinate of the interrupt on the lamina of light based on the position of the interrupt as detected by the light receiving array.

16. The apparatus of claim 15, wherein the light receiving array is a waveguide substrate, the waveguide substrate including:

a plurality of waveguide channels, each waveguide channel having a light input end proximate the lamina of light and an output end; and

a plurality of photosensitive elements, each photosensitive element positioned proximate the output end of one of the waveguide channels, and configured to convert a light signal received through the waveguide channel and to convert it into an electrical signal.

17. The apparatus of claim 16, wherein the photosensitive elements comprise one of the following types of photosensitive elements: charge coupled devices or MOS imaging devices.

18. The apparatus of claim 16, wherein the light receiving array further comprises a plurality of light receiving elements configured to direct incident light from the lamina into the light input end of each of the plurality of waveguide channels respectively.

19. The apparatus of claim 18, wherein the light receiving elements comprise but are not limited to one of the following:

(i) a single lens;

(ii) a compound lens; or

(iii) an optical system.

20. The apparatus of claim 15, wherein the optical position detection device further comprises a light filter to filter a selected wavelength range of light from the lamina .

21. The apparatus of claim 1, wherein the lamina of light defines a two dimensional plane and the optical position detection device further comprises a first light receiving array positioned along one side of the lamina and a second light receiving array positioned along a second side of the lamina, wherein the first side and the second side are adjacent to one another.

22. The apparatus of claim 21, further comprising a first light source and a second light source positioned along a third side and an fourth side of the lamina, the third side and the fourth side being adjacent to one another and being opposite of the first side and the second side respectively.

23. The apparatus of claim 1, further comprising a sleep mode element configured to dim the lamina of light if a data entry is not detected by the optical position detection device after a predetermined period of time.

24. A method, comprising;

interrupting a lamina of light at selected position, the selected position representing a data entry to a data input device; and

calculating the coordinate location of the interrupt in the lamina of light to determine the data entry.

25. The method of claim 24, wherein the interrupting the lamina of light at the selected position further comprises:

identifying a position on a display screen corresponding to a data entry;

touching with an input device the position on the display screen corresponding to the data entry;

interrupting the laminate of light positioned in the free space adjacent the display screen during the touching of the display screen with the input device; and

identifying the data entry by determining the coordinates of the interruption in the lamina of light.

26. The method of claim 25, wherein determining the coordinates of the interruption further comprises:

determining the position where incident lamina light is blocked at one or more of a plurality of light receiving elements.

27. The method of claim 24 further comprising generating the lamina of light prior to interrupting the lamina of light.

28. A method, comprising;

providing a data input device, the data input device comprising:

providing a lamina of light; and

providing an optical position detection device, optically coupled to the lamina of light, and configured to detect data entries to the provided input device by determining the location of interrupts in the provided lamina caused when data is entered to the input device.

29. The method of claim 28, further comprising a providing a display screen, the provided lamina of light being positioned in the free space adjacent the provided display screen, whereby the lamina of light in the free space adjacent the provided display screen is interrupted when data entries directed to the provided display screen are made by contacting the display screen.

30. The method of claim 28, wherein the provided lamina of light defines a two dimensional plane and the provided optical position detection device further comprises providing a first light receiving array positioned along one side of the lamina and providing a second light receiving array positioned along a second side of the lamina, wherein the first side and the second side are adjacent to one another.

31. The method of claim 30, further comprising providing a first light source and providing a second light source positioned along a third side and an fourth side of the lamina, the third side and the fourth side being adjacent to one another and being opposite of the first side and the second side respectively.

32. A method of claim 28, wherein the provided lamina comprises but is not limited to one of the following dimensions:

(i). a one dimension plane defined by a first axis;

(ii) a two dimensional plane defined by a first axis and a second axis; or

(iii) a three dimensional space defined by a first axis, a second axis, and a third axis.

33. The method of claim 28, wherein the provided lamina of light is of substantially uniform intensity.

34. The method of claim 28, wherein the provided lamina of light is of substantially non-uniform intensity.

35. The method of claim 28, wherein the provided lamina of light is periodically cycled on and off during operation of the provided data input device.

36. The method of claim 35, further comprising providing a filter device configured to subtract the measured ambient light during an off cycle of the lamina of light from the measured light during an on cycle of the lamina of light.

37. The method of claim 29, wherein the display screen is for one of the follow: types of devices: a personal computer, a workstation, a computer server, a mobile computer, a point of sale device, a personal digital assistant (PDA). a cell phone, a combination thereof, or any other type of data entry device.

38. The method of claim 28, wherein the provided lamina of light is generated from a collimated light source.